

NISTTech

Reciprocity Microscopy - A Versatile Super-resolution Technique

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Images



Example of improvement in image resolution.

Abstract

Optical microscopy is pervasively implemented for academic and industrial application. For device fabrication and many fundamental scientific research areas the length scales of interest are on the nano-scale, which is inaccessible using conventional microscopy techniques. Several techniques have been developed that allow for higher resolution imaging. These techniques are broadly characterized as superresolution microscopy. One approach to superresolution relies on engineering the excitation volume. However, this approach leads to artifacts in the images that limits its usefulness. This has been overcome in some cases by exploiting specific optical processes, such as fluorescence or nonlinear processes. However, these approaches are not suitable for the wide variety of optical processes required to explore the nano-scale.

NIST has invented a versatile approach that is suitable for a wide variety of optical processes. This is accomplished by implementing a spatial filter in the detection arm to eliminate the excitation artifacts from the detection volume.

Status of Availability

This invention is available for licensing exclusively or non-exclusively in any field of use.

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